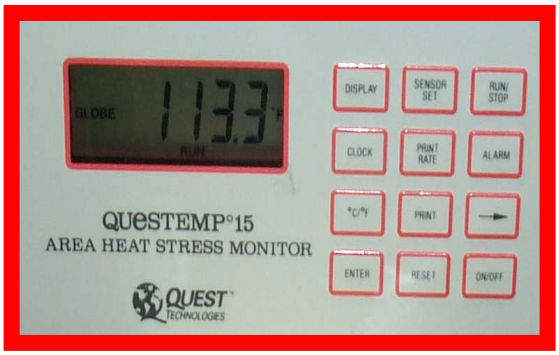
Contents



1.0 Purpose/Scope

This procedure provides a standardized method for the operation of the *Questemp 15* Area Heat Stress Monitor and disseminating results to the BNL population by the SHSD Heat Stress Notification system.

The *Questemp 15* provides a method to survey the workplace heat stress exposure to outdoor workers in typical work clothing (long pants and short sleeve shirt of cotton or cotton blend).

The site wide area monitoring data is not representative of:

- Work while wearing moisture resistant protective clothing such as Tyvek or "PCs". Exposure monitoring for workers in PPE should be done via *IH10160 Personal Dosimetry for Heat Stress.*
- Work in artificially elevated heat situations such as near ovens and other large heat sources. Exposure monitoring for workers near heat sources should be done using a *Questemp15* placed in the local environment of these workers.
- Indoor work. Exposure monitoring for workers in indoor areas should be done by a *Questemp15* placed in the local environment of these workers.

2.0 Responsibilities

2.1 Use of the *Questemp 15* shall be limited to persons who act under the direction of a competent hazard assessment person and have demonstrated the competency to satisfactorily use the meter, as evidenced by experience and training, to the satisfaction of their supervision or existing qualification criteria set by their organization.

2.2 Personnel that perform exposure monitoring with this instrument are responsible to follow all steps in this procedure.

3.0 Definitions

3.1 *Wet Bulb Globe Temperature (WBGT):* a measurement of ambient heat that factors in the influence of wind speed and relative humidity to estimate the risk to workers from heat stress illnesses.

3.2 *Occupational Exposure Limit (OEL):* The maximum time weighted average (TWA) exposure permitted for employee exposure, based on the less of the OSHA Permissible Exposure Limits (PEL) [none published] or ACGIH Threshold Limit Value (TLV). At this time, the ACGIH WBGT serves as the BNL OEL.

4.0 Prerequisites

Obtaining BNL Web and Oracle Passwords.

5.0 Precautions

5.1 **Hazard Determination:** The operation of this meter does not cause exposure to any chemical, physical, or radiological hazards. The meter design does not cause significant ergonomic concerns in routine use. The meter does not generate Hazardous Waste.

5.2 **Personal Protective Equipment:** No PPE is needed to operate this equipment. Appropriate PPE may be needed if the meter is taken to areas other than the lot beside Building 120 based on the hazards in the area being entered. Check with the FS Representative for the area.

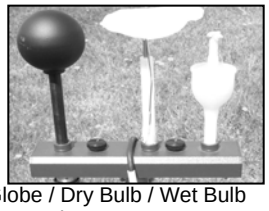
6.0 Procedure

6.1 **Equipment:**

- Questemp 15 Meter Body & Sensing Head
- Battery (9 volt alkaline)
- Data Cable(Questemp 15 meter to computer)
- A/B toggle switch
- Printer Cable
- Computer
- Printer
- Bottle with Distilled or De-ionized Water

Meter Body (Inside Lab 1-24)

Temperature Sensing Head (Outside Building)



Globe / Dry Bulb / Wet Bulb Thermometers

6.2 **Placement of equipment:**

Electronic warm-up is not required for this meter.

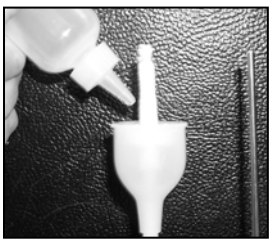
- The sensor head should be placed in the environment for 5–10 minutes before logging data so that the thermometers can equilibrate with that area.
- Place the sensor head at shoulder height (on a tripod) in a location that will not be in the shade for the entire sampling period and is not sheltered from the prevailing winds.
- Connect the meter sensor head to the meter body and the meter body to the IH Lab computer via the appropriate data cables.

6.3 **Start-up and Warm-up of the Questemp 15**

6.3.1 **Meter on:** (Do nothing now.) The THI computer program will automatically turn on the meter later. Meter should be off.

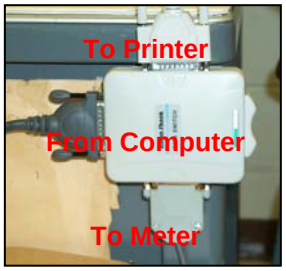
6.3.2 **Battery Check:** (Do nothing now.) The THI computer program will check the battery power status and warn the user if it is too low. The Manual states battery life is 100 hours, with RS232 use depleting it faster.

6.3.3 **Water to thermometers:** Add distilled or de-ionized water to the wick of the wet bulb thermometer before use. Check it at least every two hours and add when no pooled liquid is visible.



6.4 **Connect meter to computer:**

- Connect the data cable from the meter (see Step 6.2) to the A/B toggle switch in Building 120 lab.
- Move the A/B Toggle switch to "**meter**".

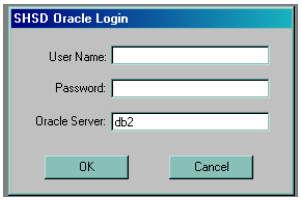


6.5 **Start up of the computer program:** On the IH Lab computer,

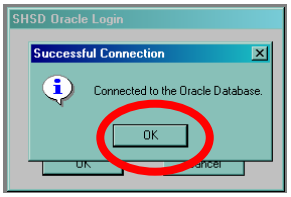
- Start up computer and log on as "HeatStressAlert". Use the password assigned to that name.
- Open Outlook.
- Open (Left click) on the <***THI Icon***> on the desktop.

6.5.1 **SHSD Oracle Login:** Log-in with your Oracle User name and Oracle Password.

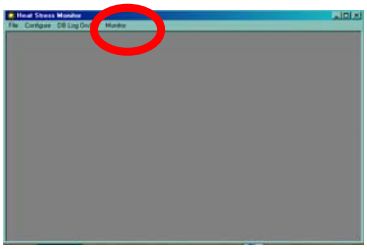
- Then press <***OK***>**.**



6.5.2 Press <***OK***> in response to "Connected to the Oracle Database".



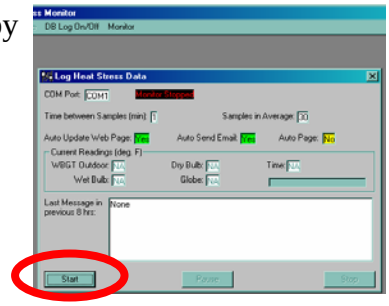
6.5.3 Select "Monitor" from the Menu Tool Bar.



6.5.4 The *Main Heat Stress Monitoring Page* appears followed by verification of set up pages.

- Press <***Start***>.

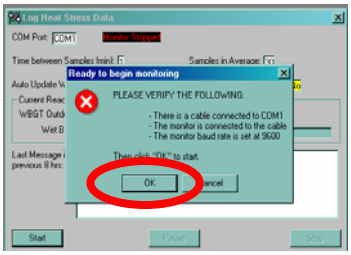
Note: The setting should be:
Com Port: **Com1**
Time between sample: **1**
Samples in Average: **60**
Auto Update Web: **Yes**
Auto Send email: **Yes**
Auto Page: **No**



6.5.5 Check the status of the cables and meter.

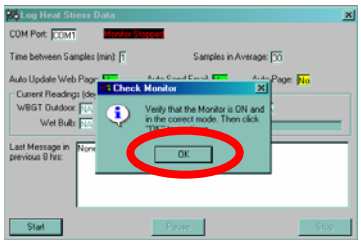
- Then answer <***OK***> to

"Verify the Following:"
Cable connected to COM1
Monitor connected to Cable
Monitor Baud Rate 9600".



6.5.6 Check the status of the Questemp15 monitor.

- Answer <***OK***> to "*Verify monitor is on*". <u>This will activate the meter.</u>
- Check the computer screen to ensure that "Monitor Running" now appears.



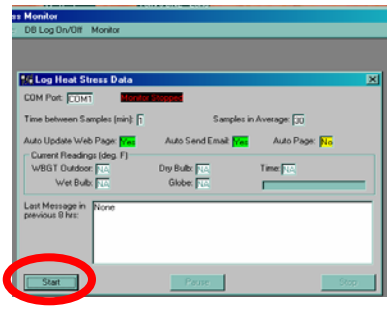
6.6 **Start logging with the meter:** On the Questemp 15 meter,

- Press and hold <Reset> for the 3-2-1 countdown. This will clear previous data. Display will read "----".
- Press <***Run/Stop***>. Data now logs automatically. Data will be sent to the computer. (The word "*Run*" should appear below the temperature reading numbers.)

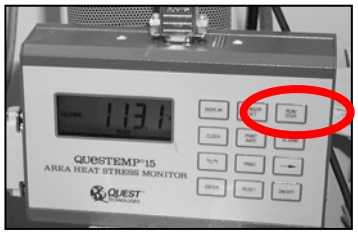
6.6.1 Verify that the data is being logged into the computer by checking the IH Web page- Heat Stress. A display as shown in *Attachment 9.2* should occur. Be sure to "refresh" the page.

6.7 **End Monitoring:** At end of Day:

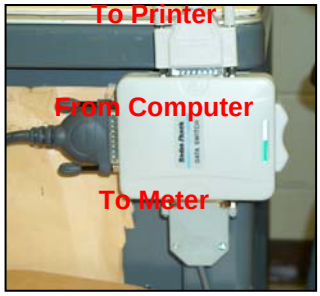
- Press <***STOP***> on the computer program.
- Press <Run/Stop> on the meter. (Do not power down yet).



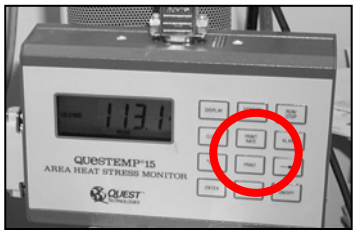
6.8 **Stop Data logging:** Press <***Run/Stop***> on the meter to stop the data logging.
(The word "*Run*" should disappear from below the temperature reading numbers)



6.9 **Connect the meter to the printer:** Move the A/B Toggle switch to "Printer".



6.10 **Printing Data:**



- Turn the Laser Printer on.
- On the Questemp 15 meter, double press <***Print***> <***Print***>. The display should flash.
- Use the < → > button to move from "9600" to a display of "PrII",
- Press <Enter>. The report, as shown in Attachment 9.3 should begin printing..

6.11 **Record Retention:**
File the printed record, or handwritten version of Attachment 9.4 if a printed record can not be made, and save it in the SHSD File Code 101.

7.0 Implementation & Training

7.1 **Training prior to using this meter:**

7.1.1 Demonstration of proper operation of this instrument to the satisfaction of the employee's supervision.

7.1.2 A record of qualification will be maintained on an equivalent of Attachment 9.5.

7.1.3 Personnel shall re-qualify on at least a three year basis.

8.0 References

8.1 BNL Subject Area Natural Hazards in the Environment

8.2 ACGIH American Conference of Governmental Industrial Hygienists Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.

9.0 Attachments

9.1 BNL Heat Stress Notification Levels

9.2 BNL Heat Stress Notification Web Page

9.3 Example of a Print-out from the meter

9.4 Heat Stress Survey Form

9.5 Sample of Qualification form

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division INDUSTRIAL HYGIENE GROUP Standard Operating Procedure: Field Procedure	NUMBER **IH101500** REVISION **SHSD FINAL Rev 2**
SUBJECT: INSTRUMENT OPERATION: **Heat Stress Site Notification** **Using the Questemp 15 Area Heat Stress Monitor**	DATE **05-18-04** PAGE **9** OF 15

10.0 Documentation

Document Review Tracking Sheet		
PREPARED BY: *(Signature and date on file)* **R. Selvey** **Author** **Date 05/03/01**	**REVIEWED BY:** *(Signature and date on file)* **R. Wilson** **SHSD IH Group** **Date 05/08/01**	**APPROVED BY:** *(Signature and date on file)* **R. Selvey** **SHSD IH Group Leader** **Date 05/08/01**
Filing Code: **IH52QR.01**	**DQAR** **Date**	**Effective Date:** **05/08/01**

Periodic Review Record		
Date of Review	Reviewer Signature and Date	Comments Attached
6/12/01	*(Signature and date on file)* R. Selvey	Revised with shut down steps and printer toggle switch steps.
05/18/04	*(Signature and date on file)* R. Selvey	Revised Attachment 9.4. Revised format to Section 7 Implementation and Training. Added Attachment 9.5 Minor text modification.

Attachment 9.1

BNL Heat Stress Notification Levels

Based on 2001 Adopted ACGIH WBGT Screening Criteria (Wet Bulb Globe Temperature) (°C) °F								
Work-Rest Regimen (each hour)	**Work Load**							
	Light		**Moderate**		**Heavy**		**Very Heavy**	
	Unac-climated	Acclimated	Unac-climated	Acclimated	Unac-climated	Acclimated	Unac-climated	Acclimated
Continuous Work	(27.5) 81.5	(29.5) 85.1	(25) 77	(27.5) 81.5	(22.5) 72.5	(26) 78.8	----	----
75% Work - **25% Rest**	(29) 84.2	(30.5) 86.9	(26.5) 79.7	(28.5) 83.3	(24.5) 76.1	(27.5) 81.5	----	----
50% Work - **50% Rest**	(30) 86	(31.5) 88.7	(28) 82.4	(29.5) 85.1	(26.5) 79.7	(28.5) 83.3	(25) 77	(27.5) 81.5
25% Work - **75% Rest**	(31) 87.8	(32.5) 90.5	(29) 84.2	(31) 87.8	(28) 82.4	(30) 86	(26.5) 79.7	(29.5) 85.1

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division INDUSTRIAL HYGIENE GROUP Standard Operating Procedure: Field Procedure	NUMBER **IH101500**
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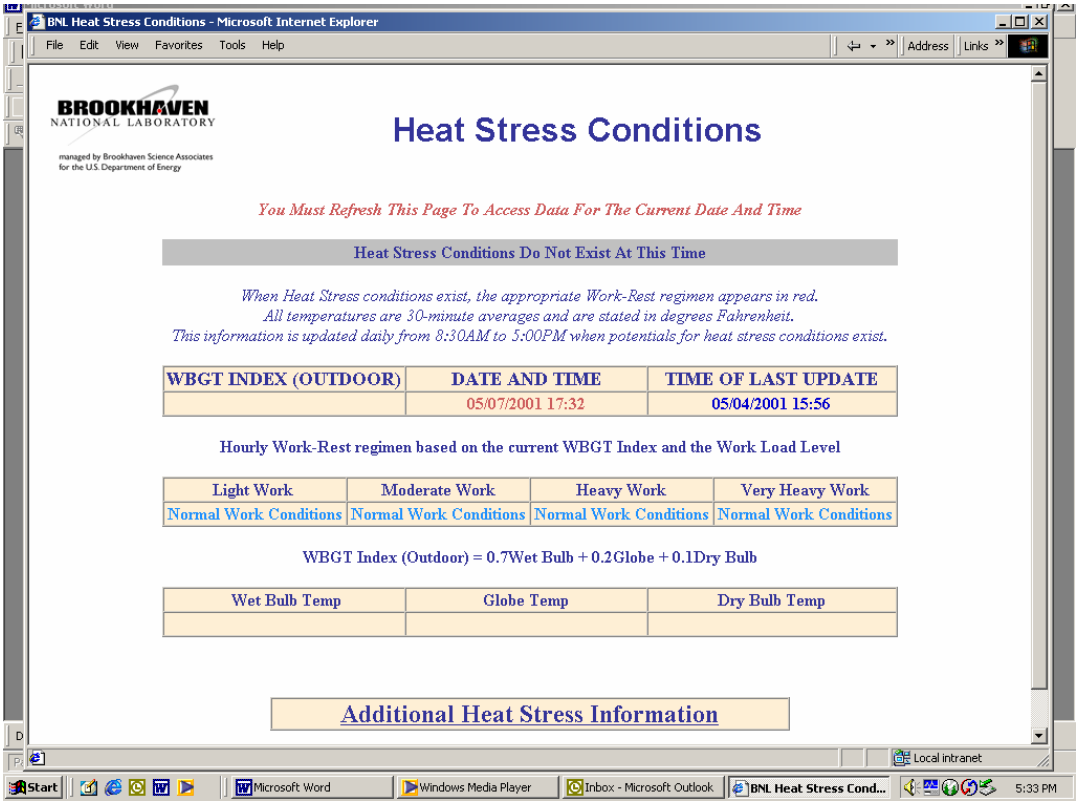
SUBJECT: INSTRUMENT OPERATION: **Heat Stress Site Notification** **Using the Questemp 15 Area Heat Stress Monitor**	DATE **05-18-04**
	PAGE **11** OF 15

Attachment 9.2

BNL Heat Stress Notification Web Page

Note: The page must be refreshed each time it is viewed for it to display the current data.



BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division INDUSTRIAL HYGIENE GROUP Standard Operating Procedure: Field Procedure	NUMBER **IH101500** REVISION **SHSD FINAL Rev 2**
SUBJECT: INSTRUMENT OPERATION: **Heat Stress Site Notification** **Using the Questemp 15 Area Heat Stress Monitor**	DATE **05-18-04** PAGE **12** OF 15

Attachment 9.3

Example of a Print-out from the Questemp 15 meter.

QUEST TECHNOLOGIES
QUESTEMP 15 WBGT AREA HEAT STRESS MONITOR

Software Version Number: 1.9 Serial Number: KL8060025

Name:

Location:

Date: 12-JUN-1
Start Time:09:25:49 End Time:09:27:42 Total Run Time:00:01:54

Alarm Level Setting - Sensor Set #1 WBGT OUT: 199.8 degree C
Print Rate: 10 minute

WBGT CUSTOM: 0.70 WB + 0.20 GLOBE + 0.10 DB

SENSOR SET # 1

	HIGH TEMP	TIME	LOW TEMP	TIME	AVG. TEMP
WET BULB	67.1	09:27	66.2	09:26	66.4
DRY BULB	73.4	09:27	72.5	09:26	72.7
GLOBE	95.4	09:25	92.8	09:27	93.9
WBGT IN	75.2	09:25	74.5	09:26	74.7
WBGT OUT	72.9	09:25	72.3	09:26	72.5
WBGT CUSTOM	72.9	09:25	72.3	09:26	72.5

TIME	WET	DRY	GLOBE	WBGT_I	WBGT_O	WBGT_C	ALARM
09:25	66.4	73.0	95.4	75.1	72.8	72.8	

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division INDUSTRIAL HYGIENE GROUP Standard Operating Procedure: Field Procedure	NUMBER **IH101500**
	REVISION **SHSD FINAL Rev 2**
SUBJECT: INSTRUMENT OPERATION: **Heat Stress Site Notification** **Using the Questemp 15 Area Heat Stress Monitor**	DATE **05-18-04**
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Attachment 9.4

BNL SHSD
Heat Stress Form

(next page)

BROOKHAVEN NATIONAL LABORATORY
SAFETY & HEALTH SERVICES ION DIVISION

HEAT STRESS ALERT
FIELD MONITORING & ALERT CHECKLIST

DATE:	SURVEYOR(S):

I. AREA INFORMATION

DEPT: **HP**	BLDG: **120**	ROOM: **OUTDOORS: EAST OF BUILDING**
SOURCE: **AMBIENT AIR TEMPERATURE**		
ENGINEERING CONTROLS: **HEAT STRESS ALERT NOTIFICATION MADE IF SET POINT EXCEEDED**		

II. SURVEY INSTRUMENT INFORMATION

INSTRUMENT: **QUEST ELECTRONICS**	MODEL: **QUESTEMP 15**	SERIAL#: **KL 2060001 or KL 8060025**
FACTORY CALIBRATION DATE:	PRE-CAL: n/a BY: n/a	POST CAL: n/a BY: n/a

III. SAMPLING INFORMATION & RESULTS

HAZARD: HEAT STRESS	UNITS: DEGREE F (C) WBGT	CORRECTION FACTOR: N/A

_____See attached printout or record below

TIME	WBGT-OUT (°F) (OUT)	WB	DB	GL	COMMENTS (Sun/ Clouds/ Wind)

Return completed form to: IH Lab, Building 120 FILE CODE: IH101500-9.4

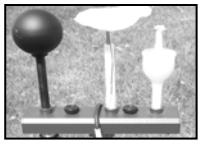
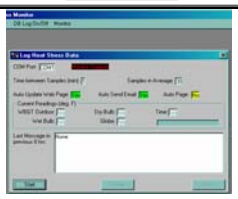
Attachment 9.5

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division **INDUSTRIAL HYGIENE GROUP** Standard Operating Procedure: Field Procedure	NUMBER **HP-IHP-101500**

Heat Stress Site Notification

Using the Questemp 15 Area Heat Stress Monitor

Personnel Qualification Record

1	**Principles of Heat Stress,** Demonstrated knowledge of heat stress temperature measurement and the reason for sampling.	
2	**Set up of meter,** Demonstrated how to: • Place the meter outdoors • Add water to thermometer	
3	**Operation of Computer Program,** • Log onto computer, password for computer known • Log onto BNL network, password to network known • Log on to Oracle, password known • Run program	
4	**Downloading of Data,** Demonstrated how to: • Printout hardcopy of monitoring data	

Name (Print)	Signature	Life Number
Date:	Expiration Date:	Pass/Fail

Qualified By:	Date: